

**A.S.19: Sample Space: Determine the number of elements in a sample space and the number of favorable events**

- 1 The Grimaldis have three children born in different years.  
  - a Draw a tree diagram or list a sample space to show all the possible arrangements of boy and girl children in the Grimaldi family.
  - b Using your information from part a, what is the probability that the Grimaldis have three boys?
  
- 2 If Laquisha can enter school by any one of three doors and the school has two staircases to the second floor, in how many different ways can Laquisha reach a room on the second floor? Justify your answer by drawing a tree diagram or listing a sample space.
  
- 3 Kimberly has three pair of pants: one black, one red, and one tan. She also has four shirts: one pink, one white, one yellow, and one green. Draw a tree diagram or list the sample space showing all possible outfits that she could wear, if an outfit consists of one pair of pants and one shirt. How many different outfits can Kimberly wear?
  
- 4 Samuel is buying a new car. He wants either a convertible or a hatchback. Both types of cars are available in red, white, or blue and with automatic or standard transmission. Draw a tree diagram or list a sample space of all possible choices of cars that are available.
  
- 5 Clayton has three fair coins. Find the probability that he gets two tails and one head when he flips the three coins.
  
- 6 Mr. Laub has three children: two girls (Sue and Karen) and one boy (David). After each meal, one child is chosen at random to wash dishes. If the same child can be chosen for both lunch and dinner, construct a tree diagram or list a sample space of all the possible outcomes of who will wash dishes after lunch and dinner on Saturday. Determine the probability that one boy and one girl will wash dishes after lunch and dinner on Saturday.
  
- 7 A restaurant sells kids' meals consisting of one main course, one side dish, and one drink, as shown in the table below.

Kids' Meal Choices

Main Course	Side Dish	Drink
hamburger	French fries	milk
chicken nuggets	applesauce	juice
turkey sandwich		soda

Draw a tree diagram or list the sample space showing all possible kids' meals. How many different kids' meals can a person order? Jose does not drink juice. Determine the number of different kids' meals that do *not* include juice. Jose's sister will eat *only* chicken nuggets for her main course. Determine the number of different kids' meals that include chicken nuggets.

**A.N.7: Multiplication Counting Principle: Determine the number of possible events, using counting techniques or the Fundamental Principle of Counting**

- 1 The local ice cream stand offers three flavors of soft-serve ice cream: vanilla, chocolate, and strawberry; two types of cone: sugar and wafer; and three toppings: sprinkles, nuts, and cookie crumbs. If Dawn does not order vanilla ice cream, how many different choices can she make that have one flavor of ice cream, one type of cone, and one topping?
  - 1) 7
  - 2) 8
  - 3) 12
  - 4) 18
- 2 How many different sandwiches consisting of one type of cheese, one condiment, and one bread choice can be prepared from five types of cheese, two condiments, and three bread choices?
  - 1) 10
  - 2) 13
  - 3) 15
  - 4) 30
- 3 A certain car comes in three body styles with a choice of two engines, a choice of two transmissions, and a choice of six colors. What is the minimum number of cars a dealer must stock to have one car of every possible combination?
  - 1) 13
  - 2) 36
  - 3) 42
  - 4) 72
- 4 When Kimberly bought her new car, she found that there were 72 different ways her car could be equipped. Her choices included four choices of engine and three choices of transmission. If her only other choice was color, how many choices of color did she have?
  - 1) 6
  - 2) 12
  - 3) 60
  - 4) 65
- 5 Juan has three blue shirts, two green shirts, seven red shirts, five pairs of denim pants, and two pairs of khaki pants. How many different outfits consisting of one shirt and one pair of pants are possible?
  - 1) 19
  - 2) 84
  - 3) 130
  - 4) 420
- 6 In a school building, there are 10 doors that can be used to enter the building and 8 stairways to the second floor. How many different routes are there from outside the building to a class on the second floor?
  - 1) 1
  - 2) 10
  - 3) 18
  - 4) 80
- 7 How many different outfits consisting of a hat, a pair of slacks, and a sweater can be made from two hats, three pairs of slacks, and four sweaters?
  - 1) 9
  - 2) 12
  - 3) 24
  - 4) 29
- 8 The school cafeteria offers five sandwich choices, four desserts, and three beverages. How many different meals consisting of one sandwich, one dessert, and one beverage can be ordered?
  - 1) 1
  - 2) 12
  - 3) 3
  - 4) 60
- 9 A deli has five types of meat, two types of cheese, and three types of bread. How many different sandwiches, consisting of one type of meat, one type of cheese, and one type of bread, does the deli serve?
  - 1) 10
  - 2) 25
  - 3) 30
  - 4) 75